CLAIMS

What is Claimed:

1. An improved ejector sleeve for molding a raised aperture in a molded article formed within a mold having an ejector plate and a core pin, the ejector sleeve comprising:

a base portion located at a first end of the ejector sleeve for mounting the sleeve to the ejector plate of the mold;

a tube portion extending from the base to a second end of the ejector sleeve, the tube having and inner surface defining a central bore for receiving the core pin and an outer surface defining the exterior of the tube;

a lip located at a second end of the ejector sleeve for forming at least a portion of the raised aperture in the molded article; the width of the lip being defined as the distance between the inner surface and outer surface of the tube at the lip, the width of said lip being less than forty thousandths of an inch.

2. The improved ejector sleeve of Claim 1 wherein the width of the lip is further defined as the difference between the external diameter and internal diameter of the tube at the lip.

3. The improved ejector sleeve of Claim 1 wherein the width of the lip is less than thirty thousandths of an inch.

4. The improved ejector sleeve of Claim 1 wherein at least a portion of the surface of the sleeve is coated with a surface coating having a thickness of less than .0001 of an inch of a material selected from the group consisting nickel, chromium, alloys of nickel and alloys of chromium.

5. The improved ejector sleeve of Claim 4 wherein said coating is an alloy of nickel which further includes phosphorus and polytetrafluouroethylene.

6. An improved ejector sleeve and core pin system for molding a raised aperture in a molded article formed within a mold having an ejector plate, the system comprising;

(1) an ejector sleeve including, (a) a base portion located at a first end of the ejector sleeve for mounting the sleeve to the ejector plate of the mold, (b) a tube portion extending from the base to a second end of the ejector sleeve, the tube having and inner surface defining a central bore and an outer surface defining the exterior of the tube, and (c) a lip located at a second end of the ejector sleeve for forming at least a portion of the raised aperture in the molded article; the width of the lip being defined as the distance between the inner surface and outer surface of the tube at the lip, the width of said lip being less than forty thousandths of an inch;

(2) an core pin having a first end with a head adapted to be retained in a cavity formed in the mold base and a second end dimensioned for receipt within the central bore of the ejector sleeve and having a pin tip which defines at least a portion of the raised aperture when the mold is closed; and

(3) a plug having a base with (a) a shoulder for engaging a stop surface in an core pin aperture formed in the mold, (b) a threaded exterior surface for engaging a threaded surface in the aperture formed in the mold, (c) a driving surface for engagement with a rotating driving tool to tighten the mounting plug into position, and (d) a core pin contacting surface for supporting a surface of the core pin within the core pin aperture.

7. The system of Claim 6 further comprising a sleeve extension for receipt of the ejector sleeve having a first end and a second end, the first end of the sleeve extension having a base portion adapted to mount to an ejector plate, the second end of the sleeve extension having a slot for receiving the base of the ejector sleeve, and a tube portion extending between the base and slot and defining a through bore dimensioned to receive the core pin.

8. The system of Claim 6 wherein the width of the lip is further defined as the difference between the external diameter and internal diameter of the tube at the lip.

9. The system of Claim 6 wherein the width of the lip is less than thirty thousandths of an inch.

10. The system of Claim 6 wherein at least a portion of the surface of the sleeve is coated with a coating having a thickness of less than .001 of an inch of a metal compound selected from the group consisting nickel, chromium, alloys of nickel and alloys of chromium.

11. A mounting plug for mounting an injection mold component having a head portion and tip portion within an aperture in a mold, the mounting plug comprising:

a base having a shoulder for engaging a stop surface of the aperture formed in the mold;

a threaded exterior surface for engaging a threaded surface in the aperture formed in the mold;

a driving surface adapted to engage a rotating driving tool to tighten the mounting plug into position; and

a mold component contacting surface to support the head portion of the mold component within the aperture.

12. The mounting plug of claim 11 wherein said mold component is a core pin and wherein the mold component contacting surface is dimensioned to support the head portion of the core pin.

13. The mounting plug of claim 12 wherein the tip portion of the core pin is adapted to be inserted within an ejector sleeve for forming a raised aperture in the surface of a molded article.

14. The mounting plug of claim 11 wherein the mold component is an ejector pin, the contacting surface is adapted to support an ejector pin, and the stop surface of the aperture is formed in the ejection plate of the mold.

15. The mounting plug of claim 11 wherein the mold component contacting surface is adapted to support a sucker pin.

16. A method for mounting an injection mold component having a tip, shoulder, and head portion in a single aperture formed in the mold, the method comprising the steps of:

machining a first portion of the single aperture with an internal diameter dimensioned to receive the tip of the mold component;

machining a second portion of the single aperture with an internal diameter dimensioned to receive a plug body and dimensioned to receive the head portion of the mold component with some clearance to allow a floating mount, the second portion being machined to a depth slightly exceeding the height of the plug, the step formed at the transition between the first portion and second portion forming a mold component shoulder retaining surface;

machining a third portion of the single aperture with an internal diameter dimensioned to receive the shoulder portion of the mounting plug at a depth closing matching the height of the shoulder, the step formed at the transition between the between the second portion and third portion of the single aperture forming a stop surface in the mold for contacting the shoulder portion of the mold plug;

machining a thread into the second portion of the single aperture dimensioned to receive a threaded portion of the mounting plug;

placing the mold component within the single aperture such that the head of the mold component is retained within the second portion of the single aperture; and

rotating the mounting plug into position such that the shoulder is retained by the stop surface of the single aperture and such that sufficient clearance is provided around the head to create a floating mount of the mold component.

17. The method of Claim 16 wherein the mold component is a core pin with accompanying ejector sleeve and wherein the method further comprises the steps of:

machining a slot in one of the ejector plate or pin plate for retaining the sleeve base;

inserting the sleeve base in the slot; and

inserting the core pin in the ejector sleeve.

18. The method of Claim 16 wherein the mold component is a sucker pin.

19. The method of Claim 16 wherein the mold component is an ejector pin and the second portion of the single aperture is formed in one of the ejector plate and the pin plate.

20. The method of Claim 19 wherein the third aperture portion is formed in the exterior surface of an ejector plate and wherein the method further comprises the steps of:

installing the mold into a mold press;

running the mold press until replacement of the pin becomes necessary;

jogging the mold press into a position where the exterior surface of the ejector plate is accessible without disassembly of the mold;

removing the ejector pin by counter-rotating the plug;

inserting a second ejector pin of similar dimensions in the single aperture; and

rotating the plug into position such that a head of such ejector pin is retained within the single aperture by a floating mount.

21. A sleeve extension for receipt of the an ejector sleeve comprising:

a base located on a first end of the sleeve extension and being adapted to mount to a slot formed in one of an ejector plate or pin plate;

a slot located on a second end of the sleeve extension for receiving a base portion of an ejector sleeve; and

a tube portion extending between the base and slot and defining a through bore dimensioned to receive the ejector sleeve and a core pin.

22. An injection mold having an improved ejector pin retaining system comprising:

a first mold portion having surfaces defining a portion of a mold cavity;

a second mold portion having surfaces defining a portion of a mold cavity, the first and second mold portions being moveable between an opened position to eject a molded article and a closed position to mold the plastic article;

an ejector plate located within one of the first and second mold portions for providing reciprocal motion in a direction opposite to the movement of the first and second mold portions, the ejector plate having an aperture formed in an exterior surface, the aperture having a stop surface, and an interior threaded portion formed therein;

an ejector pin having a first end with a head adapted to be retained in an aperture formed in an exterior surface of the ejector plate and a second end including a molded article contacting surface, the article contacting surface contacts a portion of the molded article when the mold opens to assist in ejection of the molded article from the mold; and

a retaining plug for providing a floating mount including, (a) a base with a shoulder for engaging the stop surface within the aperture in the ejector plate, (b) a threaded exterior surface for engaging the threaded interior surface within the aperture formed in the ejector plate, (c) a driving surface for engagement with a rotating driving tool to tighten the mounting plug into position, and (d) an ejector pin contacting surface for supporting the surface of the ejector pin within the aperture in the ejector plate.